Severe winds on September 21st 2010

On the evening of September 21st, wind gusts in excess of 50 mph swept across most of Southwest Lower Michigan. Some areas measured wind gusts greater than 70 mph (Table 1). In spite of the powerful winds, damage surveys conducted by the National Weather Service Office in Grand Rapids revealed only spotty tree damage in Muskegon, Kent, Ionia, and Clare Counties that resulted in some power outages.

TABLE 1. Measured wind gusts at selected locations.

Location	Wind gust (mph)	Estimated time (EDT)
Harrison	48	657 PM
Grandville	41	757 PM
Muskegon GLERL	76	835 PM
Fennville West County Park	75	839 PM
South Haven	63	840 PM
Tulip City Airport	72	845 PM
Jamestown	56	902 PM
Grand Valley State campus in Grand Rapids	56	905 PM
Grand Rapids International Airport	72	913 PM
Battle Creek	48	943 PM
Mount Pleasant	51	1008 PM
Lansing Capital City Airport	51	1012 PM
WILX in Lansing	47	1018 PM
Mason	54	1032 PM

The strong winds at the Grand Rapids International Airport were caused by a bow echo, which is when a storm accelerates and assumes a “bow” shape (Fig. 1). This case was further complicated by the fact that two thunderstorms merged just southwest of the radar site (Fig. 2), which is denoted by the circles. The bowing shape of the storm can be seen in Fig. 2b just as it is crossing the Grand Rapids airport. Radar estimated winds of greater than 75 mph were occurring right by the radar in Figs. 2b and 2c.

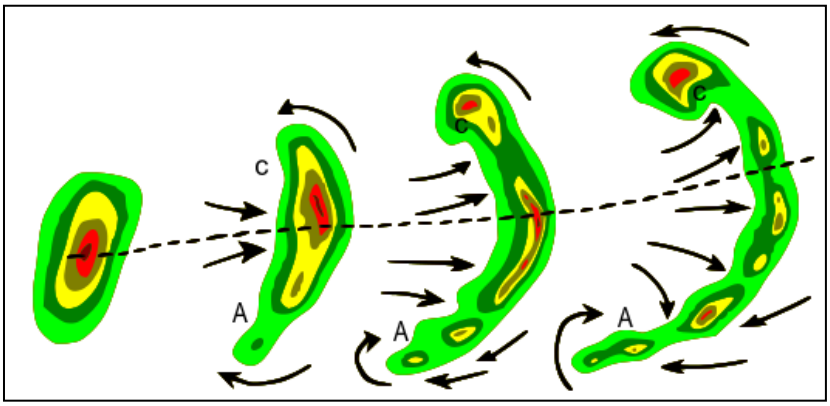

FIG. 1. Schematic of a bow echo.

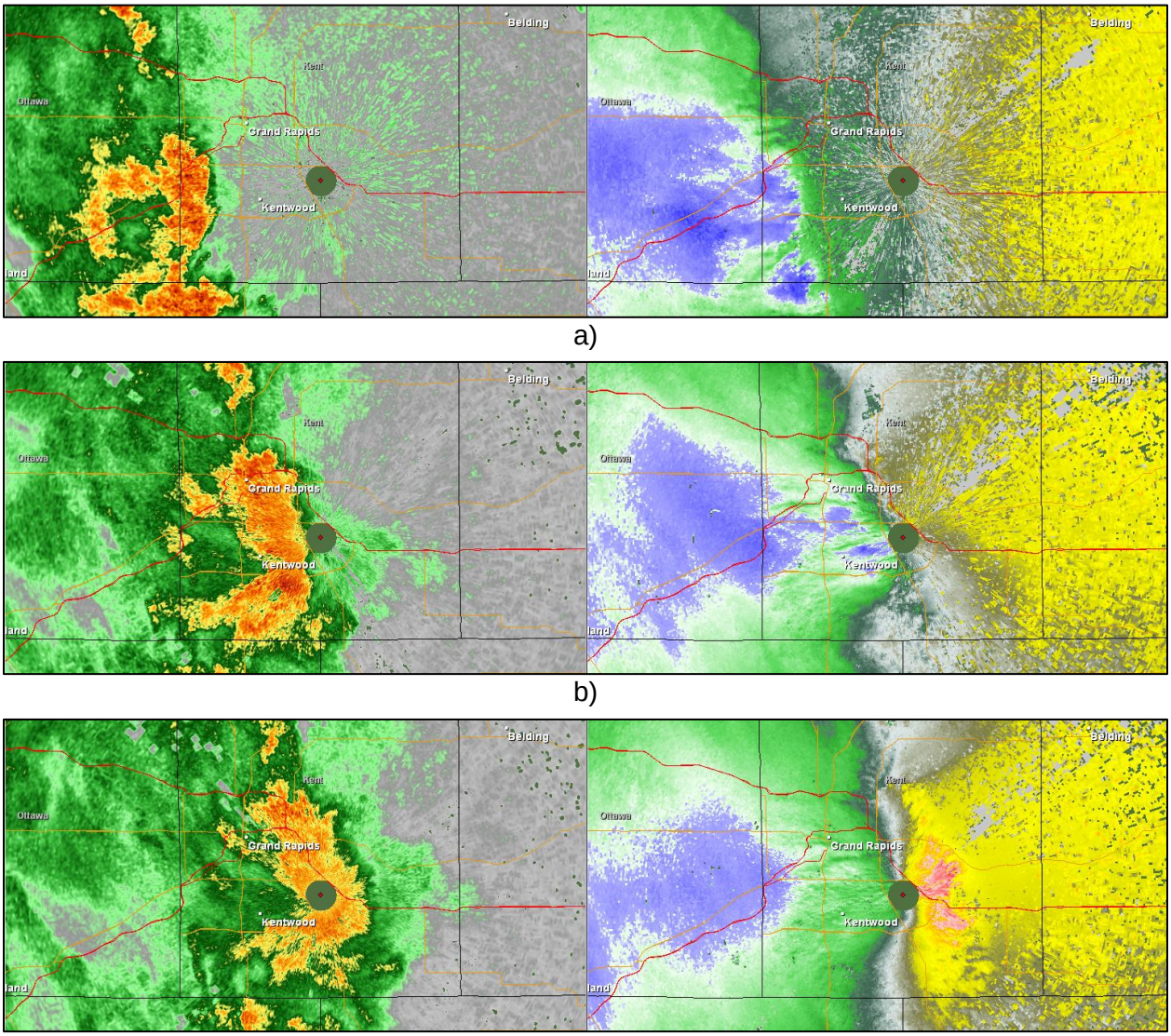

FIG. 2. Radar reflectivity (left) and velocity (right) images for a) 900 PM, b) 909 PM, and c) 914 PM.

Vertical cross sections of the storm as it approached the radar can be seen in Fig. 3. An area of heavy precipitation formed aloft and then descended to the ground, which further intensified the winds around the Grand Rapids airport.

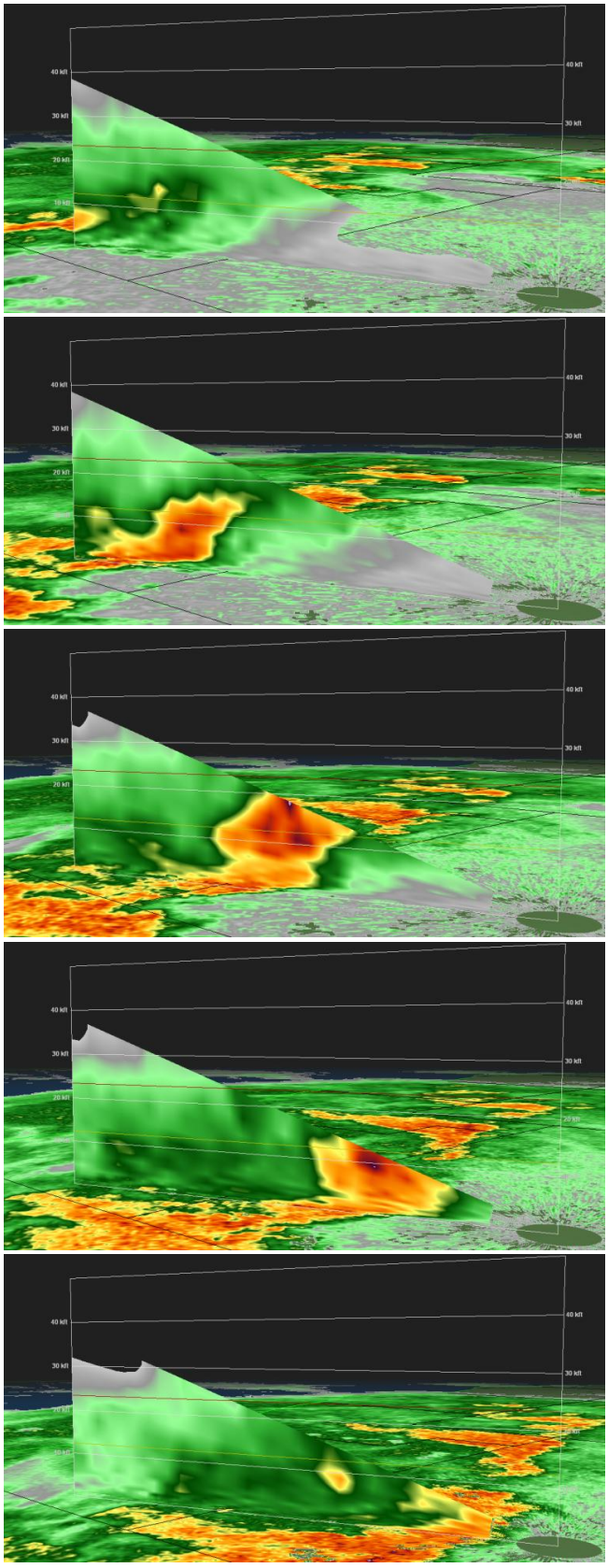

FIG. 3. Vertical cross section of storm as it approached the Grand Rapids radar.